Kinetic Methods of Quantitative Analysis.   SOV/75-14-1-11/32
Communication 5. A Kinetic Method for the Quantitative Determination of
Tantalum

time intervals. Initial concentrations were:

tantalum $2.10^{-6} - 5.10^{-5}$ m; potassium iodide $2.10^{-4} - 2.10^{-3}$m;

hydrogen peroxide $2.10^{-4} - 2.10^{-3}$ m;
hydrochloric acid 0.1 - 0.5 m. To obtain an equation for the
reaction velocity, the dependence of the latter on the
concentration of the individual reagents was investigated.
Basing on the results illustrated in diagrams the reaction
velocity can be formulated as follows:

$$\frac{d\,[J_2]}{d\tau} = (x_0 + x_1 C_{H+}) \cdot C_{J^-} \cdot C_{H_2O_2} \cdot C_{Ta} \cdot$$

where C_{J^-}, $C_{H_2O_2}$, C_{H+}, C_{Ta} are the respective

concentrations, x is the velocity constant of reaction
(catalysis coefficient). Also the influence of foreign ions
upon the accuracy of tantalum determination according to this

Card 2/3

Kinetic Methods of Quantitative Analysis.   SOV/75-14-1-11/32
Communication 5. A Kinetic Method for the Quantitative Determination of
Tantalum

method was investigated. It was found that in solutions
containing no reaction catalyzing elements, large quantities of
the usually present cations and anions do not cause any
disturbance. Fluorides retard reaction, as they bind tantalum
to a complex. The accelerating effect of nitrate ions is
explained by traces of nitrite, by which reaction is catalyzed;
titanium and zirconium do not disturb, as their oxalate
complexes do not catalyze the reaction (Ref 1). Nor does niobium
up to a three-fold excess disturb the determination of tantalum.
The same applies for sulfates in concentrations of up to 0.1 m.
The new method described for the determination of tantalum is
high-sensitive. There are 4 figures, 1 table, and 4 references,
3 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut
               (Ivanovo Chemical-Technological Institute)

SUBMITTED: January 20, 1958

Card 3/3

5(4)   SOV/76-33-2-14/45
AUTHORS: Vasil'yev, V. P., Zolotarev, Ye. K., Yatsimirskiy, K. B.

TITLE: The Entropy of Gaseous Monatomic Ions (Entropii gazo-
                obraznykh odnoatomnykh ionov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 2,
                pp 328 - 330 (USSR)

ABSTRACT: Values of the entropy of gaseous ions are often needed
                for calculating the entropy of hydration of ions for the
                quantitative calculation of a series of cycles in which
                gaseous ions appear in intermediate stages. The calculation
                of the entropy of gaseous monatomic particles is carried
                out using a well-known equation of statistical thermody-
                namics (1) (Ref 2) in which the entropy of the rotation of
                the monatomic gases is neglected. In chemical equilibrium
                at medium and high temperatures the entropy of the nuclear
                spin can also be neglected (Ref 2). Thus in the calculation
                of the entropy of a monatomic ion at standard conditions
                only the atomic weight of the particle and the statistical
                weight of the electronic ground level must be known. A
Card 1/2   table is given (Table 1) showing entropy values for 66

The Entropy of Gaseous Monatomic Ions

gaseous monatomic ions at standard conditions. The majority
of the data on the electronic configuration and the terms
of the ground state were taken from the publications
(Refs 3,5). In the cases where no data were given in the
publications the most probable electronic structure was
assigned and the terms were derived according to Gregory
(Gregori) (Ref 4). There are 1 table and 5 references, 2
of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo
                Chemical Technological Institute)

SUBMITTED: July 5, 1957

Card 2/2

5,4130
5,4120

~~5-(3,4)~~
AUTHOR: Yatsimirskiy, K. B.

66739

SOV/20-129-2-33/66

TITLE: Solubility of the Compounds of Transition Metals in the Light of the Crystal Field Theory

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 2, pp 354 - 356 (USSR)

ABSTRACT: If a metal ion with an incomplete electron shell comes into a field of anions or polarized molecules, the energetic main level is split up into sublevels. The number of the latter can be computed by the aid of the group theory (Ref 1) (Stark's intramolecular effect). If the sublevels in the gaseous ion below the main levels are filled with electrons, additional energy is obtained, the so-called extra-stabilization energy. The value of it can be computed by a formula (Refs 2,3) $E = \rho V$, (1) where V denotes the difference between two energetic levels and ρ is a multiplier which is dependent on the electronic structure of the metal ion and on the spatial arrangement of the field-forming anions or molecules around the metal ion. For the dissolution of a salt in water the author gives equation (2). The field formed in the crystal by the anions X is succeeded by the field formed by the H_2O-molecules. In this case, the effect of the

Card 1/3

66739

Solubility of the Compounds of Transition Metals in the   SOV/20-129-2-33/66
Light of the Crystal Field Theory

crystal field constitutes a difference of the energies of extra-
stabilization (3). A transformation of equation (3) leads to:
$\Delta E = \Delta \rho V_{H_2O} + \rho^X \Delta V$ (4), where $\Delta \rho = \rho_{H_2O} - \rho^X$, $\Delta V = V_{H_2O} - V_X$
holds. There is the possibility of indicating the entire course
of the value ΔE at least in a first approximation. Table 1 shows
the results of such computations for various ratios of V_{H_2O} and
V_X. The values given in table 1 show that the solution heats of
the salts in the sequence: Mn^{2+}, Fe^{2+}, Co^{2+}, Ni^{2+}, Cu^{2+}, and Zn^{2+}
do not change linearly with the change of the ordinal number.
In the case of copper salts, deviations in the direction of en-
dothermal effects (negative values of ΔE) do always occur. Sign
and magnitude of deviation in other salts depend on the field
force (V_x); in the case of weak fields, deviations occur in the
direction of exothermal effects, in the case of strong ones in
the direction of endothermal effects. Table 2 shows values of
solution heats taken from a reference book (Ref 5) for halides,
hydroxides, sulfates, and sulfides of the mentioned metals as
well as the deviations from such values detezmined by means of

Card 2/3

Solubility of the Compounds of Transition Metals in the   66739
Light of the Crystal Field Theory   SOV/20-129-2-33/66

linear interpolation. For reasons of convenience, the sign of
deviation is changed into the inverse. The course of change in
halides reminds one of the first type of change of $\Delta E(V_{H_2O} \leqslant V_X)$,
that of hydroxides of the 2nd or 3rd type of change of
$\Delta E (V_X \rangle V_{H_2O})$, and in the case of sulfides, the 4th type

$(V_X \gg V_{H_2O})$. The solubility of a salt is characterized by the
amount of the solubility product (S.-P.). Logarithm of S.-P,
(at constant temperature) is proportional to the change of free
energy with an inverse sign $\Delta Z = - 2.3RT$ lg S.-P.   (5)
Table 3 supplies S.-P. logarithms of hydroxides, oxyquinolates,
and sulfides of the mentioned metals as well as the deviations
from the linear course. These data are in good agreement with
those given in tables 1 and 2. Thus, the above results confirm
the above mentioned theoretically derived rule. There are
3 tables and 7 references, 3 of which are Soviet.

PRESENTED: July 1, 1959, by A. A. Grinberg, Academician

SUBMITTED: July 1, 1959
Card 3/3

YATSIMIRSKIY, K. B.

Instability Constants of Complex Compounds, by K.B. Yatsimitskiy and V.P. Vasil'yev. New York, Pergamon Press, 1960.
VIII, 218 p. graphs, tables.
Translated from the original Russian: Konstanty nestoykosti kompleksnykh s oyedineniy, Moscow, 1959.
Includes references.

YATSIMIRSKIY, K. B., BUDARIN, L. I.

"Determination of Equilibrium Constants in Systems Involving Complex Formation, on the Basis of Study of Catalytic Polarographic Currents"

submitted at the Conference on Kinetic Methods of Analysis, Ivanovo, 14-16 June 1960

So: Izvestiya Vysshikh Uchebnykh Zavedeniy SSSR, Khimiya i Khimicheskaya Technologiya, Vol III, No 6 Ivanovo, 1960, pages 1113-1116.

YATSIMIRSKIY, K. B.

"Present Status and Prospects in the Development of Kinetic Methods of Analysis"

submitted at the Conference on Kinetic Methods of Analysis, Ivanovo, 14-16 June 1960

So: Izvestiya Vysshikh Uchebnykh Zavedeniy SSSR, Khimiya i Khimicheskaya Technologiya, Vol III, No 6 Ivanovo, 1960, pages 1113-1116.

YATSIMIRSKIY, K. B. (IVANOVO)

"The Use of Kinetic Methods for the Determination of
Noble Metals"

paper submitted to the Fifth Conference on the Analysis of Noble Metals, Novosibirsk,
20-23 September 1960

So: Zhurnal analiticheskoy khimii, Vol XVI, No. 1, 1961, page 119

S/003/60/000/003/001/001
B020/B077

AUTHORS: Yatsimirskiy, K. B., Doctor of Chemical Sciences, Professor

TITLE: A Plan to Introduce a Study of Advanced Methods of Chemical
                Analysis

PERIODICAL: Vestnik vysshey shkoly, 1960, No. 3, pp. 77 - 79

TEXT: The question of organizing instructions on advanced methods of
chemical analysis, usually combined as physicochemical methods, came up
quite often in publications of institutions of higher education, at the
konferentsiya po metodike prepodavaniya analiticheskoy khimii (Conference
on Methods of Instructing Analytical Chemistry) held by the Ministerstvo
vysshego obrazovaniya (Ministry of Higher Education) in 1949 and was the
main point of discussion at the soveshchaniye po metodam prepodavaniya
analiticheskoy khimii (Conference on Methods of Instructing Analytical
Chemistry) in 1957. For future technologists, the new curriculum provides
68 hours of instruction in methods of physicochemical analysis in the
fourth term. This will make it possible to add instruction in analytical

Card 1/3

A Plan to Introduce a Study of Advanced   S/003/60/000/003/001/001
Methods of Chemical Analysis   B020/B077

chemistry in the near future to all institutions of higher education
teaching chemical technology, including the large group of optical
methods (absorption and emission spectroscopy, nephelometry, turbidimetry,
etc.), electrochemical methods (electroanalysis, polarography, potenti-
ometry, conductometry, etc.), and also radiochemical and other methods
of analysis. I. P. Alimarin, Corresponding Member AS USSR, tried these
methods of instruction with success at the Moskovskiy institut tonkoy
khimicheskoy tekhnologie (Moscow Institute of Fine Chemical Technology).
So far not even a name has been found for this new subject; the author
suggests the name "Optical, Electrochemical, and Radiochemical Analytical
Methods". The institute mentioned under "Association" started teaching
this subject in the schoolyear of 1957/58 to eight groups of about 200
students. The division of each course and the equipment of the labora-
tories are described, and the length of these courses is given as 20 - 30
hours and that of laboratory work as 40 hours. The basic and auxiliary
sciences which form part of the above-mentioned subject are enumerated.

Card 2/3

A Plan to Introduce a Study of Advanced
Methods of Chemical Analysis

S/003/60/000/003/001/001
B020/B077

Finally, 13 problems for laboratory work are mentioned. A shortcoming
of these instructions is seen in the shortage of suitable literature,
since there is only one book that deals with this subject: "Fiziko-
khimicheskiye metody analiza" (Physicochemical Methods of Analysis") by
Yu. S. Lyalikov, published by Metallurgizdat, Moscow, 1951. A coworker of
the author translated and enlarged the English book by G. V. Yuing (Hewing)
"Instrumental Methods of Chemical Analysis" ("Instrumental'nyye metody
khimicheskogo analiza"), New York, 1954. It would be desirable to increase
the courses to 30 - 35 hours and laboratory work to 60 - 70 hours.
Ivanovskiy sovnarkhoz (Ivanovo sovnarkhoz) is mentioned.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Institute
of Chemical Technology)

Card 3/3

S/030/60/000/010/013/018
B021/B058

AUTHOR: Yatsimirskiy, K. B., Doctor of Chemical Sciences

TITLE: The Development of Kinetic Analysis Methods

PERIODICAL: Vestnik Akademii nauk SSSR, 1960, No. 10, pp. 108 - 110

TEXT: These analysis methods develop successfully at present, but
so far they have not been specially discussed at a conference. For
this reason the Ministerstvo vysshego i srednego spetsial'nogo
obrazovaniya SSSR (Ministry of Higher and Intermediate Special
Training USSR) and the Commission for Analytical Chemistry of the
Akademiya nauk SSSR (Academy of Sciences USSR) held a Conference on
Kinetic Analysis Methods at the Ivanovskiy khimiko-tekhnologicheskiy
institut (Ivanovo Chemical and Technological Institute) from June
14 to 16, 1960. It was attended by: Collaborators of the Institut
geokhimii i analiticheskoy khimii Akademii nauk SSSR (Institute of
Geochemistry and Analytical Chemistry of the Academy of Sciences USSR),
the Institut obshchey i neorganicheskoy khimii Akademii nauk USSR

Card 1/ 3

The Development of Kinetic
Analysis Methods

S/030/60/000/010/013/018
B021/B058

(Institute of General and Inorganic Chemistry of the Academy of
Sciences UkrSSR), the universities of Moscow, Kiyev and Dnepropetrovsk,
the Institut khimicheskikh reaktivov (IREA) (Institute of Chemical
Reagents (IREA)), as well as collaborators of a number of other
scientific research institutes, schools of higher learning and plant
laboratories. The following lectures were delivered: I. P. Alimarin
and Yu. V. Yakovlev studied the applicabilities of various methods for
determining traces of impurities in high-purity materials; K. B.
Yatsimirskiy reported on the present state and the development
prospects of kinetic analysis methods; S. I. Sinyakova, on the use of
kinetic electric currents in polarography for determining small
concentrations of some elements. A number of reports dealt with new
methods for the determination of sulfur (A.K. Babko and L. V. Markova),
copper and molybdenum (B. Ye. Reznik, G. M. Ganzburg, N. A. Bednyak
and M. V. Pchelkina), tungsten (R. P. Pantaler), polonium (V. I.
Kuznetsov) and silver (M. N. Orlova). Some reports dealt with the
possibilities of using kinetic methods for studying the complex
formation (L. P. Rayzman, K. Ye. Prik). A. K. Babko and

Card 2/3

The Development of   S/030/60/000/010/013/018
Kinetic Analysis Methods   B021/B058

N. M. Lukovskaya reported on the influence of complex formation on
the kinetics and mechanism of some reactions of chemiluminescence;
K. B. Yatsimirskiy and L. I. Budarin, on the determination of the
composition and stability of some complexes by means of polarographic
methods. Finally, it is stated that the great majority of kinetic
analysis methods described in publications was tried out with pure
solutions and only on few substances. Few studies only dealt with
the analysis of industrial products. The elaboration of concrete
analysis methods for industrial products by utilizing kinetic methods
is described as being one of the most important tasks for chemists-
analysts. For the development of kinetic analysis methods it is
necessary to strengthen the ties of analytical chemistry with
physical, organic and biological chemistry.

Card 3/3

S/153/60/003/004/014/040/XX
B020/B054

AUTHORS: Orlova, M. N., Yatsimirskiy, K. B.

TITLE: Kinetics and Mechanism of the Decomposition Reaction of
                 the Hexacyanoferroate Ion in the Presence of Silver
                 Compounds

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i
                 khimicheskaya tekhnologiya, 1960, Vol. 3, No. 4,
                 pp. 630 - 636

TEXT: The hexacyanoferroate ion is distinguished by high stability. At
increased temperature (Ref.1), or under the action of light (Ref.2),
the hexacyanoferroate ion decomposes slowly in weakly acid solution to
form soluble Prussian blue. The rate of this reaction increases consider-
ably in the presence of Hg^{2+} ions (Refs.3,4) which bind the cyanide ions
in the form of a stable complex. The kinetics of the decomposition proc-
ess of the hexacyanoferroate ion in the presence of silver compounds
was studied at $40^{\circ}C$ by an optical method. To determine the dependence of

Card 1/4

Kinetics and Mechanism of the Decomposition   S/153/60/003/004/014/040/XX
Reaction of the Hexacyanoferroate Ion in the B020/B054
Presence of Silver Compounds

the reaction rate in the presence of $AgNO_3$ on the acidity of the solu-
tion, the authors conducted a test series at different pH and constant
$K_4[Fe(CN)_6]-$ and $AgNO_3$ concentrations (Fig.1). The pH of the solutions
was measured with a glass electrode in an ЛП-5 (LP-5) tube potentio-
meter. The decomposition reaction only sets in at a pH below 5, and its
rate increases with acidity. The dependence of light absorption on the
concentration of potassium hexacyanoferroate is shown in Fig.2, and
that of the decomposition reaction rate on the $AgNO_3$ concentration in
Fig.3. At $AgNO_3$ concentrations of from $2.0 \cdot 10^{-6}$ to $1.3 \cdot 10^{-5}$ moles/l,
the relation between light absorption of the solutions at a certain re-
action time (D_{100}) and the logarithm of the $AgNO_3$ concentration is
linear (Fig.4). The catalytic action of $AgNO_3$ is considerably increas-
ed by addition of thiourea, even in amounts of only 10^{-5} moles/l
(Fig.5). Fig.6 shows the change in light absorption of the solutions
with time at variable $AgNO_3$ concentration, and Fig.7 the linear

Card 2/4

Kinetics and Mechanism of the Decomposition   S/153/60/003/C04/014/040/XX
Reaction of the Hexacyanoferroate Ion in the   B020/B054
Presence of Silver Compounds

relation between the light absorption of the solutions and the logarithm
of the silver salt concentration for a certain time in a concentration
range of silver ions between $3 \cdot 10^{-7}$ and $2 \cdot 10^{-6}$ moles/l, and in the
presence of thiourea. The catalytic reaction is much slowed down by ad-
dition of a NaCN solution to a weakly acid hexacyanoferroate solution
containing $AgNO_3$ and thiourea (Fig.8). The authors revealed the reaction
mechanism according to which the slowest reaction is the decomposition
of the intermediate complex formed from positively charged catalyst ions
$(Ag^+$ or $Ag(CSN_2H_4)_2^+)$ and the cyanide complex of bivalent iron. They also
derived the kinetic equation for this reaction, and calculated the rate
constants (Table 1). At a pH of 3.7, and at $40^\circ C$, the rate constant of
the reaction is equal to 0.016 ± 0.003 min^{-1} (Table 2). The authors de-
termined the equilibrium constant of the conversion of the cyanide com-
plex of silver into a thiourea complex in weakly acid solution. Silver
can be quantitatively determined in concentrations of the order of

Card 3/4

Kinetics and Mechanism of the Decomposition   S/153/60/003/004/014/040/XX
Reaction of the Hexacyanoferroate Ion in the   B020/B054
Presence of Silver Compounds

magnitude between 10^{-7} and 10^{-6} moles/l on the basis of light absorption
measurements in solutions containing potassium hexacyanoferroate, an
acetate buffer, a silver salt, and thiourea. There are 8 figures,
2 tables, and 14 references: 3 Soviet, 1 US, 4 British, 2 Yugo-Slav,
2 French, 1 Austrian, and 1 Dutch.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut, kafedra
               analiticheskoy khimii (Ivanovo Institute of Chemical
               Technology, Department of Analytical Chemistry)

SUBMITTED: December 9, 1958

Card 4/4

S/153/60/003/005/001/016
B013/B058

AUTHOR: Yatsimirskiy, K.

TITLE: Anatoliy Fedorovich Kapustinskiy (December 29, 1906 -
               August 26, 1960)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i
               khimicheskaya tekhnologiya, 1960, Vol. 3, No. 5,
               pp. 779 - 782

TEXT: This article is devoted to Professor Anatoliy Fedorovich
Kapustinskiy, Corresponding Member of the Academy of Sciences USSR,
Doctor of Chemical Sciences, who died on August 26, 1960. Anatoliy
Fedorovich Kapustinskiy was born in Zhitomir on December 29, 1906. He
graduated from the khimicheskiy fakul'tet Moskovskogo gosudarstvennogo
universiteta (Chemical Division of Moscow State University) in 1929.
At the start of his activities he did research work at the Vsesoyuznyy
institut prikladnoy mineralogii (All-Union Institute of Applied Mineralogy)
receiving support by his teachers I.A. Kablukov, Honored Academician, and
Academician E.V. Britske. At the age of 27, he was appointed Professor
and Head of the Department of Gor'kiy gosudarstvennyy universitet

Card 1/3

Anatoliy Fedorovich Kapustinskiy   S/153/60/003/005/001/016
(December 29, 1906 - August 26, 1960)   B013/B058

(Gor'kiy State University). From 1937, he was Professor and Head at the
kafedra fizicheskoy khimii Moskovskogo instituta stali (Department of
Physical Chemistry of the Moscow Steel Institute). During the Patriotic
War (1941-1943) he was Head of the Department of Physical Chemistry of
he kazanskiy gosudarstvennyy universitet (Kazan' State University).
From 1943 to his death, he was Head of the kafedra neorganicheskoy i
obshchey khimii Moskovskogo khimiko- tekhnologicheskogo instituta
(Department of Inorganic and General Chemistry of the Moscow Institute
of Chemical Technology). Kapustinskiy was elected Corresponding Member
of the Academy of Sciences USSR in 1939. From 1941, he worked at the
institut obshchey i neorganicheskoy khimii Akademii nauk SSSR (Institute
of General and Inorganic Chemistry of the Academy of Sciences USSR).
Anatoliy Fedorovich Kapustinskiy was one of the most outstanding
teachers and inorganic chemists of the USSR. He began his scientific
activity as an experimenter, developing numerous new ideas in the
theoretical field. Thermodynamics of solids and crystal chemistry were
the main fields of his scientific activity, but Kapustinskiy also
extended his research work to the field of thermodynamics of electro-
lytic solutions. His great interest was devoted to the history of

Card 2/3

Anatoliy Fedorovich Kapustinskiy   S/153/60/003/005/001/016
(December 29, 1906 - August 26,1960)   B013/B058

chemistry. More than 27 of his papers deal with historical problems.
He was Chairman of the Natsional'noye ob"yedineniye sovetskikh istorikov
khimii (National Association of Soviet Chemistry Historians). Kapustinskiy
published about 300 scientific papers, among them books, articles in
Soviet and foreign periodicals, compilations, the Great Encyclopedia, and
others. He held numerous lectures at congresses, meetings and conferences
in the USSR as well as abroad. He was active as an editor. For more than
20 years he was Assistant Chief Editor of the periodical "Izvestiya
Akademii Nauk SSSR, OKhN". He was a member of the editorial board for the
2nd edition of the Great Soviet Encyclopedia, and edited several great
publications. For his merits, Kapustinskiy was decorated by the government
with the Order of the Red Banner of Labor and several medals. There is
1 figure.

Card 3/3

YATSIMIRSKIY, K.B..

Effect of various factors on the extraction of ionic
compounds. Izv. vys. ucheb. zav; khim. i khim. tekh. 3
no. 5:823-825 '60.   (MIRA 13:12)

1. Ivanovskiy khimiko-tekhnologicheskiy institut. Kafedra
analiticheskoy khimii.
                        (Ions)

S/153/60/003/006/009/009
B103/B206

AUTHORS: Vasil'yev, V. P., Korableva, V. D., Yatsimirskiy, K. B.

TITLE: Conference on kinetic analysis methods

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i
            khimicheskaya tekhnologiya, v. 3, no. 6, 1960, 1113-1116

TEXT: In the introduction the authors state that coordination and discus-
sion of kinetic analysis methods have been deficient thus far, although
they are successfully studied in the USSR and abroad. They are of special
importance for the determination of minute amounts of admixtures and con-
centrations of elements. In this connection the Ministerstvo vysshego i
srednego spetsial'nogo obrazovaniya SSSR (Ministry of Higher and Inter-
mediate Special Educations, USSR) convened a Conference on Kinetic Analysis
Methods, which was held at the Ivanovskiy khimiko tekhnologicheskiy institut
(Ivanovo Institute of Chemical Technology) from June 14 to 16, 1960. 16
lectures were delivered by collaborators of the Institut geokhimii i
analiticheskoy khimii AN SSSR (Institute of Geochemistry and Analytical

Card 1/4

Conference on kinetic analysis...

S/153/60/003/006/009/009
B103/B206

Chemistry AS USSR), Institut obshchey i neorganicheskoy khimii AN USSR (Institute of General and Inorganic Chemistry AS UkrSSR), the Universities of Moscow, Kiyev and Dnepropetrovsk, the IvanovoInstitute of Chemical Technology and IREA (Institut khimicheskikh reaktivov, Institute of Chemical Reagents). The conference was also attended by representatives of several colleges, scientific research institutes and works laboratories as well as chemists from Ivanovo. The following subjects were dealt with in the lectures: I. P. Alimarin and Yu. V. Yakovlev; "The possibilities of modern determination methods of "ultrasmall" admixtures in "superpure" substances"; K. B. Yatsimirskiy, "The present state and development prospects of kinetic analysis methods". A. K. Babko, B. Ye. Reznik, V. I. Kuznetsov and I. G. Shafran.participated in the discussion. Further lectures dealt with the following subjects: A. K. Babko and L. V. Markova: "The photometric determination of microamounts of sulfides and sulfur in metals on the basis of the catalytic effect on the iodine-azide reaction"; B. Ye. Reznik and N. V. Pchelkina, "The photometric determination of copper and molybdenum on the basis of their catalytic effect"; B. Ye. Reznik, G. M. Ganzburg and N. A. Bednyak, "Study of the catalytic effect of some transition elements

Card 2/4

Conference on kinetic analysis...

S/153/60/003/006/009/009
B103/B206

on molybdenum reduction by means of thiocyanate"; R. P. Pantaler, "A new
kinetic determination method of tungsten- and molybdenum traces".
L. T. Bugayenko reported on the use of kinetic analysis methods in radia-
tion-chemical studies. S. I. Sinyakova gave a review on the use of kinetic
catalytic currents in polarography for the determination of very small
concentrations of several elements. K. B. Yatsimirskiy and L. I. Budarin,
"Determination of the equilibrium constants in systems with complex forma-
tion on the basis of the study of catalytic polarographic currents";
V. I. Kuznetsov and Ye. S. Ul'yanova, "Radiation-kinetic determination of
polonium". L. I. Budarin and K. Ye. Prik showed and discussed new types
of instruments for the kinetic analysis. M. N. Orlova reported on "Kinetic
determination methods of silver in solutions". Apart from those already
mentioned, G. A. Pevtsov participated in the discussion. Further lectures:
A. K. Babko and N. M. Lukovskaya, "The effect of complex-forming substances
on the catalysis of the chemiluminescence reactions". L. P. Rayzman
reported on the results of the study of complex formation of zirconium with
anions of organic acids by the kinetic method. K. Ye. Prik,"Application
of the kinetic method for studying the complex formation of tungsten (VI)

Card 3/4

Conference on kinetic analysis...

S/153/60/003/006/009/009
B103/B206

in solutions"; M. B. Shustova, "Vanadium determination in metallic titanium".
M. L. Chepelevetskiy pointed out the necessity of studying the kinetics of
heterogeneous processes, especially the formation of crystalline precipi-
tates, for the purpose of using these data in the analysis. V. M. Peshkova
pointed out the possibilities of combining the kinetic methods with extrac-
tion methods for the determination of several elements. Some results of
the conference were summarized in the closing address by K. B. Yatsimirskiy
and A. K. Babko. The authors are of the opinion that the conference was
useful and showed that the kinetic analysis methods are being successfully
developed in Moscow, Kiyev, Ivanovo, Dnepropetrovsk, Khar'kov and Odessa.
The delegates had the opportunity of informing one another on the results
and of indicating future research trends. The authors propose to elaborate
concrete methods for practical use in the analysis of industrial objects.
New types of instruments are to be elaborated and manufactured in series.
Standards with fixed content of microadmixtures should be prepared and
corresponding data should be published.

Card 4/4

5. 2620

~~5(2), 5(4)~~

AUTHOR: Yatsimirskiy, K. B.

S/078/60/005/02/005/045
B004/B016

TITLE: Determination of Structure and Geometric Configuration of Complexes by Means of Thermodynamic Data

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 2, pp 264-270 (USSR)

ABSTRACT: This paper was presented at the 8th Congress on the Chemistry of Complex Compounds, on May 26, 1959, in Kiyev. For the energy W of the interaction between an ion and the particles combining with it, the following equation is set up: $W = U + C + E$. U denotes the energy of interaction between particles of the ionic type; C is the energy additionally obtained by the formation of covalent bonds, and E is the energy of extrastabilization by the crystal field (the field of addenda). It is pointed out in the present paper that the structure of complex compounds with organic addenda may be determined by comparing the stability of compounds with central ions (Mg^{2+} and Zn^{2+}) equal with respect to their dimensions. The difference of the exponents of the instability constants of

Card 1/3

Determination of Structure and Geometric Con-   S/078/60/005/02/005/045
·figuration of Complexes by Means of Thermodynamic   B004/B016
Data

analogous complexes of Mg and Zn characterizes the degree of
covalency of the bond between metal and addendum, and depends
on number and type of the atoms which the bond is established
with. Equation (5) is derived: $\Delta C = -\Delta Z = \alpha(pK_{Zn} - pK_{Mg})$, where

ΔZ denotes the change in free energy, $\alpha = 2.3RT$ and $pK_{Zn} - pK_{Mg}$
the difference of the exponents of the instability constants.
Then follows (5a): $\Delta C = \alpha\Delta pK_{ZnMg}$. As $\Delta C = 0$, the degree of
covalency of the bond with H_2O is taken. If the bond of the
addendum A with the central ion is more covalent than the bond
with H_2O, ΔC will be positive. Table 1 gives the values of
ΔpK_{ZnMg} for some addenda. Table 2 shows that ΔpK_{ZnMg} has the
value 0.6 for each bond of the addendum by an O-atom, and the
value 2.8 for each bond by amino nitrogen. By the equation
$\Delta pK_{ZnMg} = 2.8n_N + 0.6n_O$, the structure of many complex com-
pounds can be clarified (Table 3). To characterize the geo-
metric configuration of complex compounds, the author uses the

Card 2/3

Determination of Structure and Geometric Con-   68219
figuration of Complexes by Means of Thermodynamic   S/078/60/005/02/005/045
Data   B004/B016

ratio of the change in energy of extrastabilization by the
example of Cu and Ni: $\Delta E'_{Cu}/\Delta E'_{Ni}$. The value of this ratio is

~1 for octahedral complexes (Table 4). If the addenda occupy
only 4 positions in the octahedron, two configurations will be
possible which the values $\Delta E'_{Cu}/\Delta E'_{Ni} = 1.46$ (cis-configuration)

and = 2.11 (trans-configuration) correspond to (Table 5). In
the same way, the structures of complexes, in which the ad-
denda occupy only two coordination positions will be distin-
guished by the value $\Delta E'_{Cu}/\Delta E'_{Ni}$ (Table 6). The author quotes

V. F. Toropova (Ref 6). There are 6 tables and 9 references,
7 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo In-
               stitute of Chemical Technology)

SUBMITTED: June 30, 1959

Card 3/3

YATSIMIRSKIY, K.B.; RAYZMAN, L.P.

Catalytic oxidation of iodide with hydrogen peroxide in the
presence of zirconium salts. Zhur. neorg. khim. 5 no.3:593-
598 Mr '60.   (MIRA 14:6)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
                    (Iodides)
                    (Hydrogen peroxide)
                    (Zirconyl chloride)

YATSIMIRSKIY, K.B.; ORLOVA, M.N.

Kinetics and mechanism of the conversion of the hexacyanoferrate(II) ion in the presence of a gold-thiourea complex. Zhur. neorg. khim. 5 no.10:2184-2189 O '60. (MIRA 13:10)

1. Ivanovskiy khimiko-tekhnologicheskiy institut, Kafedra analiticheskoy khimii.
(Gold compounds)   (Iron compounds)

85624

9,4300 (3203, 1043, 1143)

S/078/60/005/012/005/016
B017/B064

AUTHOR: Yatsimirskiy, K. B.

TITLE: Factors Determining the Magnitude of the Effect of a
              Crystal Field

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 12,
              pp. 2672-2676

TEXT: By the effect of a crystal field, the author understands the
change of energy in the jump of an electron from the orbit d_{xy} to the
orbit $d_{x^2-y^2}$. Fig. 1 shows the orbits of the central atom in the XY
plane. The effect of the crystal field is characterized by the electron
density in the orbits. Some factors determining the magnitude of the
effect of a crystal field, e.g., the radius and the charge of the central
ion, its electron structure, as well as the type of addenda, are ex-
plained. Fig. 2 shows the effect of a crystal field as a function of the
square product of the central ion charge and the radius. Fig. 3 shows

Card 1/2

85624

Factors Determining the Magnitude of the   S/078/60/005/012/005/016
Effect of a Crystal Field   B017/B064

the dependence of the effect of a crystal field on the electron structure
of the central atom. The effect of a crystal field for complexes of the
MX_6 and $M(H_2O)_6$ types depends only on the type of addenda, and is in-
dependent of the type of the central atom. The ratio

$$\frac{(E_1-E_2)_X}{(E_1-E_2)_{H_2O}} = \eta$$

for various complexes is given in Table 3. The effect

of a crystal field of various complex compounds of the MX_6 type is

calculated by the formula $(E_1-E_2)_X = \eta (E_1-E_2)_{H_2O}$. There are 3 figures,

2 tables, and 8 non-Soviet references.

SUBMITTED: May 25, 1960

Card 2/2

YATSIMIRSKIY, K.B.

84630

S/076/60/034/010/011/022
B015/B064

11.4000

AUTHORS: Yatsimirskiy, K. B., and Krestov, G. A.

TITLE: Lattice Entropy of Compounds Formed From Monatomic
               Ions Having the Structure of Inert Gases

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 10,
               pp. 2263 - 2267

TEXT: Lattice entropy is of theoretical and practical importance
since it forms the basis of calculating the free lattice energy from
which, in turn, important data are obtained for various processes,
e. g., dissolution, sublimation, etc. The lattice entropy of compounds
originating from monatomic ions with the electron structure of an
inert gas is calculated in the present paper on the basis of experi-
mental data. To establish a relationship between the energy and the
entropy of the crystal lattice, the authors studied the phase transi-
tion "crystal - gaseous ions" and introduce the definition of a
"conditional" temperature of ion sublimation:

Card 1/6

84630

Lattice Entropy of Compounds Formed   S/076/60/034/010/011/022
From Monatomic Ions Having the Structure   B015/B064
of Inert Gases

$$T_i' = \frac{U_{298}}{\Delta S_{298}} \qquad (3)$$

(U_{298} and ΔS_{298} = energy and entropy, respectively, of the
crystal lattice at 298°K). When comparing the values for T_i' with those
of the lattice energy, it is found that for each compound a concentra-
tion of points takes place on the curve (Fig.), and that the respec-
tive section may be defined by the following equation:

$T_i' = \alpha U_{298} + \beta$ 　 (4) 　 (α and β are constants of the single-type
compounds). The values for α and β were calculated by the method of
least squares for the three valency types 1 - 1, 2 - 1, and 2 - 2 of
compounds (Table 3). The entropy of the crystal lattice is calculated
from the following equation:

$$\Delta S_{298} = \frac{U_{298}}{\alpha U_{298} + \beta} \qquad (5)$$

Card 2/6

Lattice Entropy of Compounds Formed   S/076/60/034/010/011/022
From Monatomic Ions Having the   B015/B064
Structure of Inert Gases

The entropy of the crystalline compound was determined from the
equation

$$S_{298} = mS_{Mn+} + nS_{Xm-} - \Delta S_{298} \qquad (6)$$

(m and n = stoichiometric coefficients of the equation of phase
transition: S_{Mn+} and S_{Xm-} = entropy of gaseous ions under standard conditions
for cation and anion). Equations (4) and (5) thus represent the
relationship between the energy and entropy of the crystal lattice
and the temperature of the phase transition "crystal-ionic gas". In
some respect, there is an analogy with Trouton's rule. The entropy of
27 compounds was calculated from equations (5) and (6) (Table 4) and
compared with the corresponding data from the handbook by Rossini
et al. (Ref. 4). Equation (5) allows to calculate the lattice energy
of substances for which no thermochemical data are available, but only
the ionic radii (Table 5). A. F. Kapustinskiy is mentioned.
There are 1 figure, 5 tables and 10 references: 8 Soviet, and 2 US.

Card 3/6

84630

Lattice Entropy of Compounds Formed
From Monatomic Ions Having the
Structure of Inert Gases

S/076/60/034/010/011/022
B015/B064

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut
(Ivanovo Institute of Chemical Technology)

SUBMITTED: January 21, 1959

Table 3

λ Коэффи-циенты	2 Валентные типы соединений		
	1-1 MX	2-1 MX₂	2-2 MX
α	0,01428	0,00855	0,01125
β	755	1655	4210

Table 5

Соединения	U₃₂	Соединения	U₃₃	Соединения	U₃₁
FrF	169,2	RaF₂	546	MgTe	720
FrCl	149,6	RaCl₂	470	CaTe	666
FrBr	144,4	RaBr₂	461	SrTe	630
FrJ	136,8	RaJ₂	431	BaTe	606
				RaTe	593

Card 4/6

S/076/60/034/010/011/022
B015/B064

Соединения	$\varepsilon_{выч}$	$\varepsilon_{эксп}$	Соединения	$\varepsilon_{выч}$	$\varepsilon_{эксп}$	Соединения	$\varepsilon_{выч}$	$\varepsilon_{эксп}$
LiF	9,0	8,57	MgF$_2$	13,6	13,68	MgO	6,1	6,4
LiCl	12,9	14,2	MgCl$_2$	20,5	21,4	MgS	11,1	—
LiBr	15,0	—	MgBr$_2$	26,1	—	MgSe	14,0	—
LiJ	18,3	—	MgJ$_2$	30,1	—	MgTe	17,5	—
NaF	13,8	14,0	CaF$_2$	17,3	16,46	CaO	9,7	9,5
NaCl	17,5	17,30	CaCl$_2$	24,4	27,2	CaS	14,3	13,5
NaBr	20,5	—	CaBr$_2$	30,1	31	CaSe	18,0	16
NaJ	22,8	—	CaJ$_2$	34,1	34	CaTe	20,6	—
KF	16,9	15,91	SrF$_2$	20,9	—	SrO	13,3	13,0
KCl	20,4	19,76	SrCl$_2$	28,0	28	SrS	17,9	—
KBr	23,3	23,05	SrBr$_2$	33,7	—	SrSe	21,5	—
KJ	25,6	24,94	SrJ$_2$	37,8	—	SrTe	24,0	—
RbF	18,6	—	BaF$_2$	23,6	23,0	BaO	15,6	16,8
RbCl	23,1	—	BaCl$_2$	30,5	30	BaS	20,1	—
RbBr	26,0	25,88	BaBr$_2$	36.2	—	BaSe	23,7	—
RbJ	28,2	28,21	BaJ$_2$	40,5	—	BaTe	26,2	—
CsF	21,6	—	RaF$_2$	25,4	—	RaO	17,6	—
CsCl	25,1	—	RaCl$_2$	32,2	—	RaS	22,1	—
CsBr	27,9	29	RaBr$_2$	37,9	—	RaSe	25,7	—
CsJ	30,1	31	RaJ$_2$	42,5	—	RaTe	28,1	—
FrF	23,5	—						
FrCl	27,0	—						
FrBr	29,9	—						
FrJ	32,2	—						

Card 5/6

84630

Lattice Entropy of Compounds Formed
From Monatomic Ions Having the
Structure of Inert Gases

S/076/6o/034/010/011/022
B015/B064

35

Table 3 - Coefficients of equation (4), 1 = coefficients, 2 = valency
types of the compounds; Table 4 - calculated and experimental values
of the entropy of solid compounds originating from monatomic ions
with an inert gas envelope in energy units, 1 = compound, 2 = $S_{calc.}$,
3 = $S_{exp.}$; Table 5 - Lattice energy of francium and radium halides, radium
oxide, sulfide, and selenide, and alkaline - earth metal tellurides
(kcal/mole , 1 = compounds.

40

45

50

55

Card 6/6

60

86779

s/076/60/034/011/005/024
B004/B064

/l.5000

AUTHORS: Yatsimirskiy, K. B. and Krestov, G. A. (Ivanovo)

TITLE: Lattice Entropy of Compounds With Polyatomic Ions

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 11,
             pp. 2448 - 2453

TEXT: In a previous paper (Ref. 1), the authors studied the entropy of
the crystal lattice of compounds consisting of monatomic ions with the
electron structure of inert gases. The equation $\Delta S_{298} = U_{298}/(\alpha U_{298} + \beta)$
(1) was derived. U_{298} is the energy; ΔS_{298} is the entropy of the crystal
lattice; α, β are constants. This paper deals with compounds of monatomic
cations having the electron structure of inert gases and polyatomic hydroxy
anions. On the basis of the data of Refs. 2-4, the following values are
determined for the crystal lattice entropy:

Card 1/4

00/19

Lattice Entropy of Compounds With Polyatomic   S/076/60/034/011/005/024
Ions   B004/B064

Table 1 (values in entropy units)

Compound	ΔS_{298}	Compound	ΔS_{298}	Compound	ΔS_{298}
$NaNO_3$	65.9	Li_2CO_3	100.64	$MgCO_3$	78.5
KNO_3	63.56	Na_2CO_3	96.9	$CaCO_3$	74.5
$KClO_3$	66.66	Na_2SO_4	98.0	$SrCO_3$	74.8
$RbClO_3$	66.8	K_2SO_4	95.1	$BaCO_3$	72.6
$KBrO_3$	68.9	$Mg(OH)_2$	103.42	$MgSO_4$	76.6
$KClO_3$	63.8	$Ca(OH)_2$	101.8	$CaSO_4$	74.5
$RbClO_4$	63.8	$Mg(NO_3)_2$	113.1	$SrSO_4$	73.2
$CsClO_4$	61.59	$Ca(NO_3)_2$	107.4	$BaSO_4$	72.1
$KMnO_4$	60.49	$Ba(NO_3)_2$	106.2	$RaSO_4$	71
		$Ra(NO_3)_2$	106.8	$CaCrO_4$	69.7

As compared with the experimental values, these values show a difference A.
It is due to the rotation inhibition of the polyatomic ions in the crystal

Card 2/6

86779

Lattice Entropy of Compounds With Polyatomic Ions

S/076/60/034/011/005/024
B004/B064

which depends on the structure of the ion. $A = \eta \cdot S_{rot}$ (3) is derived (S_{rot} = rotational component of the entropy; η = degree of inhibition). For the polyatomic anions the values are given for A, S_{rot}, and $\eta = A/S_{rot}$:

Table 3, Values for A Calculated From Equation (3)

Anion	A	S_{rot}	η
OH^-	6.2	-	-
NO_3^-	11.4	19.17	0.595
ClO_3^-	14.4	22.4	0.643
BrO_3^-	16.0	23.2	0.690
ClO_4^-	12.2	20.08	0.608
MnO_4^-	9.2	20.50	0.449
CO_3^{2-}	17.0	19.64	0.855

Continuation of Table 3:

Anion	A	S_{rot}	η
SO_4^{2-}	18.4	20.17	0.912
CrO_4^{2-}	15.1	20.55	0.735

For polyatomic ions (1) takes the form: $\Delta S_{298} = U_{298}/(\alpha U_{298} + \beta) + n\eta S_{rot}$ (4). n is the number of polyatomic ions in the compound. The values for α and β were taken from Ref. 1:

Card 3/4

86779

Lattice Entropy of Compounds With Polyatomic   S/076/60/034/011/005/024
Ions   B004/B064

1-1   2-1
MX ($\alpha = 0.01428$, $\beta = 755$) MX_2 ($\alpha = 0.00855$, $\beta = 1655$)
2-2

MX ($\alpha = 0.01125$, $\beta = 4210$). The entropy of the crystalline substances was
calculated from the equation $S_{298} = mS_{M^{n+}} + nS_{X^{m-}} - \Delta S_{298}$ (5). m,n are the
stoichiometric coefficients, $S_{M^{n+}}$, $S_{X^{m-}}$ is the entropy of the gaseous ions.

Table 4 gives the values obtained for 66 compounds. There are 4 tables and
12 references: 9 Soviet and 3 US.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo
             Institute of Chemical Technology)

SUBMITTED: February 7, 1959

Legend to Table 4: 1) Compound; 2) ΔS_{298} according to equation (4);
3) S_{calc} calculated from equation (5); 4) $S_{exp} - S_{calc}$:   calculated from
the modified equation of A. F. Kapustinskiy.

Card 4/6/   IVANCVSKIY Khimiko-tekhnologicheskiy Institut

YATSIMIRSKIY, Konstantin B.

"The Stability of Coordination Compounds."

report to be submitted for the Sixth International Conference on Coordination Chemistry, IUPAC, 27 August - 1 Sep 1961, Detroit Mich.

Ivanovo Chemical Technology Inst.

YATSIMIRSKIY, K.B.

New variant of a kinetic method of analysis. Izv. vys. ucheb. zav.; khim.i khim.tekh. no.2:315-317. '61.   (MIRA 14:5)

1. Ivanovskiy khimiko-tekhnologicheskiy institut. Kafedra analiticheskoy khimii.
(Chemical reaction, Rate of)   (Chemistry, Analytical)

YATSIMIRSKIY, K.B.; ZHUKOV, Yu.A.

Kinetics of the oxidation of iodide with hydrogen peroxide in the presence of thorium salts. Radiokhimia 3 no.4:466-472 '61.

(MIRA 14:7)

(Thorium compounds) (Iodides) (Hydrogen peroxide)

STAROSTINA, V.D.; YATSIMIRSKIY, K.B.

Spectrophotometric studies of compounds of acid chrome blue K
with nickel and cobalt ions. Izv.vys.ucheb.zav; khim.i khim.
tekh. 4 no.5:710-714 '61.   (MIRA 14:11)

1. Ivanovskiy khimiko-tekhnologicheskiy institut, kafedra
neorganicheskoy i analiticheskoy khimii.
                        (Azo compounds--Spectra)

AUTHOR: Yatsimirskiy, K. B.

TITLE: Anatoliy Fedorovich Kapustinskiy (deceased)

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 3, 1961, 513-517

TEXT: On August 26, 1960, the well-known Soviet scientist Anatoliy
Fedorovich Kapustinskiy died, who has been a Corresponding Member of the
Academy of Sciences USSR, Doctor and Professor of Chemical Sciences. Born
on December 29, 1906 in Zhitomir, he finished high-school in 1922, con-
tinued with his study at the Chemical Department of Moscow University
until 1929, and worked then until 1941 in the Vsesoyuznyy institut
prikladnoy mineralogii (All-Union Institute of Applied Mineralogy). His
first publications in Soviet and foreign periodicals were published in
1929 and 1930. In 1934, he became Professor at the Department of
Physical Chemistry, Gor'kovskiy gosudarstvennyy universitet (Gor'kiy
State University). To extent his knowledge, he visited in 1935 Western
Europe and America. He worked for some time with American scientists. In
1937, A. F. Kapustinskiy became a Doctor of Chemical Sciences, and at the

Card 1/5

S/078/61/006/003/001/022
B121/B208

Anatoliy Fedorovich...

same time Professor of Physical Chemistry at Moskovskiy institut stali
(Moscow Steel Institute). During World War II, he was Professor of
Physical Chemistry at Kazanskiy gosudarstvennyy universitet (Kazan'
State University); from 1943 up to his death he was Professor of
Inorganic and General Chemistry at Moskovskiy khimiko-tekhnologicheskiy
institut im. D. I. Mendeleyeva (Moscow Institute of Chemical Technology
imeni D. I. Mendeleyev). He published about 300 papers and some
scientific books. Of special importance are his papers on the thermo-
dynamics of crystalline inorganic compounds. His papers show a high
accuracy and offer many experimental examples. He suggested a formulation
for the so-called second principle of crystallochemistry: Crystal energy
and the properties determined by it depend on the number of ions, the
ionic radii, and their polarizability. He set up the well-known
"Kapustinskiy equation" for the calculation of lattice energy, which was
completed in co-operation with K. B. Yatsimirskiy. To calculate the
lattice energy of crystals, the composition of the salts to be studied,
their charge, and the ionic radii of the participating ions have to be
determined by X-ray structural analysis. The thermodynamic constants of
many inorganic compounds were determined by Kapustinskiy. In 1949, he

Card 2/5

S/078/61/006/003/001/022
B121/B208

Anatoliy Fedorovich...

published the book "Termicheskiye konstanty neorganicheskikh veshchestv"
("Thermal constants of inorganic compounds") in co-operation with
E. V. Britske, B. K. Veselovskiy, L. M. Shamovskiy, L. G. Chentsova, and
B. I. Anvayer. A. F. Kapustinskiy and his co-workers Yu. P. Barskiy,
O. Ya. Samoylov, and I. I. Lipilina devised a new method for the thermo-
dynamic investigation of inorganic compounds. Numerous papers on the
thermochemistry of complex compounds were published together with
A. A. Shidlovskiy, B. M. Yakushevskiy, V. A. Solokhin, et al. By
crystallochemical studies he found that the ionic radii of elements change
with the ion charge and the number of electrons. In 1949,
A. F. Kapustinskiy introduced a new constant into crystallochemistry,
i.e., the "crystallochemical electronegativity". His papers revealed
the relationships between the elements in the periodic system. He found
a relation between the entropy of the ions in solution and their
position in the periodic system (1944). He further established (1958)
a relation between the heat of formation of the individual compounds and
the atomic number of their elements, which he called the rule of "thermo-
chemical logarithmics". In 1956, he suggested the electron isomerism of
atoms which gave rise to a new concept of the formation of atoms in iso-

Card 3/5

S/078/61/006/003/001/022
B121/B208

Anatoliy Fedorovich...

meric forms. He thoroughly studied the thermodynamics of solutions and dissolution processes for various systems. In his papers on the thermodynamics of solutions published in co-operation with his co-workers V. A. Mal'tsev, B. I. Anvayer, V. R. Klokman, O. Ya. Samoylov, I. I. Lipilina, B. M. Yakushevskiy, S. I. Drakin, N. M. Selivanova, I. I. Ruzavin, et al., he determined experimentally the thermal properties of ions in solutions. In 1952, he published, together with O. Ya. Samoylov, a paper on the thermochemical method of determining the coordination number of ions in solutions. The solubility products of sulfides were exactly determined and their thermodynamic characteristics checked. With K. B. Yatsimirskiy he established the theory of crystal ion dissolution (1948). Utilizing new achievements in the investigation of various systems, he worked in the field of physico-chemical analysis in cooperation with his students B. A. Shmelev, S. I. Drakin, Yu. M. Golutvin, A. N. Zhdanova, Yu. P. Barskiy, and others. Theoretical considerations enabled A. F. Kapustinskiy to develop an ingenious theory on the structure of the globe, which was reported in 1957 on the Symposium of Geochemistry in Paris. He further published various papers on the history of science of the Soviet Union and foreign countries.

Card 4/5

Anatoliy Fedorovich...

S/078/61/006/003/001/022
B121/B208

A. F. Kapustinskiy also took part in the edition of various journals, and was assistant editor of the journal "Izvestiya Akademii nauk SSSR, OKhN" for 20 years. He further took part in the edition of the great Soviet encyclopedia.

Card 5/5

89900

S/078/61/006/003/002/022
B121/B208

24.7000   1138, 1160, 1045

11.2221

AUTHOR: Yatsimirskiy, K. B.

TITLE: Lattice energy of metal salts and metallic oxides

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 3, 1961, 518-525

TEXT: The equation by A. F. Kapustinskiy (Ref. 1)

$$U = 287.2 \frac{\sum n \cdot Z_K \cdot Z_A}{r_K + r_A} \left[1 - \frac{0.345}{r_K + r_A} + 0.00870(r_K + r_A) \right]$$ (1) and

$$U = 287.2 \frac{\sum n \cdot Z_K \cdot Z_A}{r_K + r_A} \left(1 - \frac{0.345}{r_K + r_A} \right) + 2.5 \sum_n \cdot Z_K \cdot Z_A$$ (1a), respectively, is

used for calculating the lattice energy of various salts and metallic
oxides. The lattice energy obtained for compounds of cations with eight
electrons was found to differ only by 3% from the experimental values.
An exception is only the lattice energy of aluminum compounds, in which
the difference between experimental and calculated values is 9%. Table 1
presents the lattice energies of compounds of tri- and tetravalent cations

Card 1/3

89900

S/078/61/006/003/002/022

Lattice energy of metal salts...   B121/B208

with eight electrons in the outer shell. Table 2 gives the lattice
energies of compounds of the MX_2 type, and Table 3 those of compounds of
the $M^{II}X^{II}$ type. The reaction energy between cations and anions in the
lattice is expressed by the equation $U = U_i + C + E$ (3), where U_i = reac-
tion energy between the ions calculated by A. F. Kapustinskiy's equation,
E = extrastabilization energy of the crystal field, C = formation energy
of the partial covalence bond in the crystal K_nA_m. The following equation
was used to calculate C: $C = \alpha(I_K - W_A) - A$ (4), where α = constant
multiplier = 7.8, A = constant, I_K = sum of ionization potentials,
W_A = detachment energy of two electrons from anions. Considering the
energy of interaction between the ions, the ionization potential and the
detachment energy of electrons from anions, the following equation is
given to calculate the lattice energy: $U = U_i + \alpha(I_K - W_A) - A$ (5). To
obtain the lattice energy for compounds from monovalent cations and mono-
valent anions, Eq. (5) is modified in the following way:

Card 2/3

89900

Lattice energy of metal salts...

S/078/61/006/003/002/022
B121/B208

$U = U_i + \alpha(I_K - \frac{1}{2} W_A) - A$ (6), where A = 29. The lattice energy of Ag^+, Cu^+, and Tl^+ compounds was calculated from this equation with an accuracy of up to 2%. The lattice energies of compounds of cations with 18 electrons were calculated from the given equations and compared with the experimental data. Results are summarized in Table 7. The values of the lattice energies being known, the heats of formation for 16 salts were calculated from Eq. (2), results are summarized in Table 8. There are 2 figures, 8 tables, and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Institute of Chemical Technology)

SUBMITTED: February 3, 1960

Card 3/8

YATSIMIRSKIY, K.B.; MAL'KOVA, T.V.

Composition and absorption spectra of copper bromide complexes
in acetic acid solutions. Zhur.neorg.khim. 6 no.4:835-845 Ap
'61.   (MIRA 14:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
        (Copper compounds--Spectra)

YATSIMIRSKIY, K.B.; LU CHZHAO-DA [LU CHAO-TA]

Absorption spectra of complex compounds of trivalent copper in
solution. Zhur.neorg.khim. 6 no.5:1129-1134 My '61.
                                                    (MIRA 14:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.

(Copper compounds--Spectra)

YATSIMIRSKIY, K.B.; BUDARIN, L.I.

Method based on the use of catalytic polarographic currents in the
study of the complexing of molybdenum with various acids.
Zhur.neorg.khim.   6   no.8:1850-1855   Ag '61.   (MIRA 14:8)
                (Molybdenum compounds) (Acids, Organic)

KRESTOV, G.A.; YATSMIRSKIY, K.B.

Thermodynamic characteristics of complex compounds of cobalt (III)
of the chloropentammine type. Zhur.neorg.khim. 6 no.10:2294-
2303 O '61.
(MIRA 14:9)

(Cobalt compounds)

KRESTOV, G.A.; YATSIMIRSKIY, K.B.

Thermodynamic characteristics of complex compounds of cobalt (III) with neutral additives. Zhur.neorg.khim. 6 no.10:2304-2311 O '61.
(MIRA 14:9)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Cobalt compounds)

YATSIMIRSKIY, K.B.; RAYZMAN, L.P.

Zirconium complex formation with anions of organic acids in
solutions. Zhur.neorg.khim. 6 no.11:2496-2503 '61. (MIRA 14:10)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
     (Zirconium compounds)   (Acids, Organic)

YATSIMIRSKIY, K.B.; MAL'KOVA, T.V.

Use of absorption spectra for investigating the system $Cu(CH_3COO)_2$ - LiBr in acetic acid. Zhur.neorg.khim. 6 no.11:2590-2598 '61.
(MIRA 14:10)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
   (Copper compounds--Spectra) (Lithium bromide--Spectra)

VASIL'YEV, V.P.; KORABLEVA, V.D.; YATSIMIRSKIY, K.B.

Conference on kinetic methods of analysis. Zhur. anal. khim.
16 no. 1:118 Ja-F '61.
    (Chemical reaction, Rate of)   (Chemistry, Analytical--Congresses)
                                                    (MIRA 14:2)

YATSIMIRSKIY   K. B.

JAGIMIRSZKIJ, K. B.(Yatsimirskiy); ZANTHO, Robert es BECK, Mihaly[translator]

Theoretical bases for kinetic methods of analytical chemistry. Kem tud kozl MTA 16 no.4:375-387 '61.

1. Khimiko-tekhnologicheskiy institut, Ivanovo, SSSR.

(Chemistry, Analytic)   (Reaction kinetics)

PARKHOMENKO, N.V.; PRIK, G.A.; YATSIMIRSKIY, K.B.

Kinetic method for determining microquantities of cobalt in
solutions. Zhur.anal.khim. 16 no.5: 599-605 S-O '61. (MIRA 14:9)

1. Ivanovo Chemico-Technological Institute.
   (Cobalt--Analysis) (Chemical reaction, Rate of)

YATSIMIRSKIY, K.; BUDARIN, L. I.

Determination of equilibrium constants in systems with complex formation on the basis of the study of catalytic polarographic currents. Coll Cz chem 26 no.1:215-223 Ja '61.

(EEAI 10:9)

1. Ivanovskiy khimiko-tekhnologicheskiy institut, Ivanovo, SSSR.

(Chemical equilibrium)   (Polarograph and polarography)
(Systems(Chemistry))

YATSIMIRSKIY, K.B., prof., doktor khimicheskikh nauk

"Physicochemical methods of analysis" by IU.S.Lialikov. Reviewed
by K. B. IAtsimirskii. Zav.lab. 27 no.2:241-242 '61.

(Chemistry, Analytical)   (MIRA 14:3)

YATSIMIRSKIY, K.B.

Induction period in homogeneous-catalytic reactions. Izv.vys.ucheb.
zav.; khim.i khim.tekh. 5 no.1:54-57 '62.
                                              (MIRA 15:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut, kafedra
analiticheskoy khimii.
                    (Catalysis)

YATSIMIRSKIY, K.B.; BUDARIN, L.I.

Kinetic method of determining small amounts of chromium. Izv.-
vys.ucheb.zav.;khim.i khim.tekh. 5 no.2:220-224 '62.

1. Ivanovskiy khimiko-tekhnologicheskiy institut, kafedra
analiticheskoy khimii.   (MIRA 15:8)

(Chromium—Analysis)

YATSIMIRSKIY, K.B.

Objectives of Russian inorganic chemistry in connection with the decisions of the 22d Congress of the CPSU. Catalysis and complex formation in inorganic chemistry. Zhur.neorg.khim. 7 no.2:225-226 F '62.

(Catalysis)   (Complex compounds)   (MIRA 15:3)

YATSIMIRSKIY, K.B.; BUDARIN, L.I.

New method of calculating instability constants in step-by-step complex formation. Zhur.neorg.khim. 7 no.5:1090-1094 My '62.

(Complex compounds) (MIRA 15:7)

YATSIMIRSKIY, K.B.; ZHUKOV, Yu.A.

Study of oxalate complexes of thorium by the kinetic method. Zhur.neorg. khim. 7 no.7:1583-1588 Jl '62.
(Thorium oxalate)   (MIRA 16:3)

YATSIMIRSKIY, K.B.; PRIK, K.Ye.

Study of the complex formation of tungsten (VI) with organic dibasic
acids by the kinetic method. Zhur.neorg.khim. 7 no.7:1589-1594 Jl '62.

(Tungsten compounds)   (MIRA 16:3)

(Acids, Organic)

YATSIMIRSKIY, K.B.; RAYZMAN, L.P.

Catalytic oxidation of potassium iodide with hydrogen
peroxide in the presence of hafnium salts. Zhur. neorg.
khim. 7 no.8:1819-1823 Ag '62.

(MIRA 16:6)

(Potassium iodide)   (Hydrogen peroxide)
(Hafnium salts)

YATSIMIRSKIY, K.B.; BUDARIN, L.I.

Complex formation of tungsten (VI) with certain acids
studied with the aid of catalytic polarographic currents.
Zhur. neorg. khim. 7 no.8:1824-1830 Ag '62.   (MIRA 16:6)

(Tungsten compounds)   (Catalysis)

YATSIMIRSKIY, K.B.; DUCHINSKIY, Yu.S.; YEVREYEV, V.N.; MAL'KOVA, T.V.

Use of absorption spectra for determining the composition and configuration of chloride complexes of cobalt (II) in aqueous n.butanol. Zhur. neorg. khim. 7 no.8:1831-1837 Ag '62.
(MIRA 16:6)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Cobalt compounds—Spectra)
(Chlorides)

VASIL'YEVA, V.N.; YATSIMIRSKIY, K.B.

Aquation kinetics of trans-dichloro-bis-ethylenediamine
cobaltichloride. Zhur.neorg.khim. 7 no.11:2520-2523
N '62.

(MIRA 15:12)

(Cobalt compounds)
(Aquation)

YATSIMIRSKIY, K.B.; ZHUKOV, Yu.A.

Kinetic method of studying the reactions of complex formation
by displacement of equilibrium. Zhur.neorg.khim. 7 no.12:2807-
2809 D '62.   (MIRA 16:2)
           (Complex compounds)   (Chemical equilibrium)

YATSIMIRSKIY, K.B.; ALEKSEYEVA, I.I.

Spectrophotometric titration of lead with molybdate in the
ultraviolet. Zhur.anal.khim. 17 no.5:574-578 Ag '62. (MIRA 16:3)

1. Ivanovo Chemico-Technological Institute.
                    (Lead--Spectra) (Molybdates)

YATSIMIRSKIY, K.B.; FEDOROVA, T.I.

"Catalymetric" titration. Dokl. AN SSSR 143 no.1:143-145 Mr
'62.   (MIRA 15:2)

1. Ivanovskiy khimiko-tekhnologicheskiy institut. Predstavleno
akademikom I.V.Tananayevym.
                        (Titration)
                        (Catalysis)

YATSIMIRSKIY, Konstantin Borisovich; STUPNIKOVA, N.I., red.;
      PANTELEYEVA, L.A., tekhn. red.

    [Kinetic methods of analysis] Kineticheskie metody analiza.
    Moskva, Goskhimizdat, 1963.   190 p.   (MIRA 16:6)
      (Chemical reaction, Rate of)   (Chemistry, Analytical)

TRANSLATION: The possible uses of catalytic reactions in the analysis of trace elements

Card   1/2

YATSIMIRSKIY, K.B.; MOROZOVA, R.P.

Induction period in homogeneous catalytic reactions involving
hydrogen peroxide. Kin. i kat. 4 no.4:574-580   Jl-Ag '63.
(MIRA 16:11)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.

YATSIMIRSKIY, K.B.; MOROZOVA, R.P.

Effect of complex formation on the induction period in certain
homogeneous catalytic reactions. Kin.i kat. 4 no.5:772-775 S-O
'63.   (MIRA 16:12)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.

YATSIMIRSKIY, K.B.; MOROZOVA, R.P.

Some thermodynamic characteristics of starch iodide formation.
Izv.vys.ucheb.zav.; khim. i khim. tekh. 6 no.6:925-929 '63.

(MIRA 17:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut, kafedra
analiticheskoy khimii.

YATSIMIRSKIY, K.B.; MOROZOVA, R.P.

Kinetic method of study of the stability of tantalum (V) solutions
as dependent on pH and time. Izv.vys.ucheb.zav.; khim. i khim. tekh.
6 no.6:1044-1046 '63.   (MIRA 17:4)

1. Ivanovskiy khimiko-tekhnologicheskiy institut, kafedra
analiticheskoy khimii.

YATSIMIRSKIY, K.B.; ZAKHAROVA, L.A.

Spectrophotometric investigation of molybdenum thidsalts in
solution. Zhur.neorg.khim. 8 no.1:96-99 Ja '63.   (MIRA 16:5)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
     (Molybdenum salts)   (Spectrophotometry)

MAL'KOVA, T.V.; YATSIMIRSKIY, K.B.

Stability of copper bromide complexes in acetic acid solutions.
Zhur.neorg.khim. 8 no.2:332-337 F '63.   (MIRA 16:5)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
                (Copper bromides) (Acetic acid)

YATSIMIRSKIY, K.B.; ZHUKOV, Yu.A.

Complex formation of thorium with anions of organic acids in
solutions. Zhur.neorg.khim. 8 no.2:295-301 F '63.   (MIRA 16:5)
          (Thorium compounds)   (Acids, Organic)

YATSIMIRSKIY, K.B.; SKURATOV, V.I.

Kinetics of oxidation of iodine ions by hydrogen peroxide in the presence
of niobium compounds. Zhur.neorg.khim. 8 no.3:573-577 Mr '63.
(MIRA 16:4)

(Iodine)   (Hydrogen peroxide)   (Niobium compounds)

YATSIMIRSKIY, K.B.

Polyhydroxy ions. Zhur.neorg.khim. 8 no.4:811-816 Ap '63.
(MIRA 16:3)

(Ions)

S/078/63/008/004/004/013
AC59/A126

AUTHOR: Yatsimirskiy, K.B.

TITLE: Influence of the ligand field on the redox properties of the com-
               pounds of the transition elements

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 8, no. 4, 1963, 876 - 881

TEXT: The problem of the redox properties of ions and their compounds
having d-electrons on the last shell which is closely related to the stability
of the respective electron structures is discussed in this paper on numerous ex-
amples. It has been shown that the stability of compounds with different num-
bers of d-electrons is determined to a considerable degree by the crystalline
field effect and depends on the spatial position of the neighbor atoms and the
force of the acting field (see Table). The rules established for the dependence
of the stability of different compounds on the number of d-electrons can be ex-
plained by means of the ligand field theory or its simplified version - the
crystalline field theory. As is known, the influence of the field of ligands
(ions or molecules) leads to a splitting of the basic d-level into several new

Card 1/4

Influence of the ligand field on the redox S/078/63/008/004/004/013
A059/A126

levels which is schematically shown in Figure 3. The influence of the ligand
field on the value of the redox potential has been demonstrated. The equations:

$$P = I_3 - 27.9 - 0.4n_d + \Delta E ,\tag{9}$$

where P is the redox potential, n_d the number of electrons near the M^{2+} ion, I_3
the ionization potential of M^{3+}, and ΔE the change of free energy, and

where
$$\Delta E = 0.26 (2\rho' - \rho) ,\tag{13}$$

$$\rho = 2n_t - 3n_e ,\tag{14}$$

[n_t being the number of electrons on the lower level (t_{2g}) and n_e their number
on the higher level (e_g)] and ρ' refers to the higher degree of oxidation, make
it possible to calculate the redox potentials for processes in which compounds
of elements with d-electrons take part. There are 4 figures and 1 table.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Institute
of Chemical Technology)

SUBMITTED: April 14, 1962

Card 2/3

L 17008-63   EWP(q)/EWT(m)/BDS   AFFTC/ESD-3   RM/JD/JG
S/078/63/008/005/008/021

AUTHOR: Yatsimirskiy, K. B., Rayzman, L. P.

TITLE: Complexing of zirconium with the ions of inorganic acids

PERIODICAL: Zhurnal neorganicheskoy khimii, v. VIII, No. 5, May 1963,
               1107-1111

TEXT: The authors study the complex compounds of zirconium with the
anions of sulfuric, molybdic and tungstate acid in quite dilute solutions.
In the solutions studied, complexes with metal-alloy ratio of 1:1 were formed.
The authors computed the equilibrium constants for the $[ZrOSO_4]$ and $[ZrMoO_4]^2$

complexes, and also found the approximate conditional value of the equilibrium
constant for the interaction between zirconium chloroxide and sodium tungstenate.
There are 2 tables. The 1 Enghish-language reference reads as follows: R.
Connick, McVey, J. Amer. Chem. Soc., 71, 3182 (1949).
  Complexing of zirconium with the ions......
  ASSOCIATION: Ivanobo Chemico-Technological Institute.

Card 1/2